

Federal Electronics

(millions of dollars)	1970	1971	1972	1975
FEDERAL ELECTRONICS, TOTAL	11,771	11,174	11,644	13,401
Defense Department, total	10,217	9,752	10,149	11,531
Procurement, total	5,754	5,007	5,307	6,463
Communications and intelligence	1,170	887	993	1,411
Aircraft and related ground equipment	1,656	1,303	1,156	1,567
Missiles and space systems	2,075	2,027	2,271	2,440
Mobile and ordnance	346	297	284	342
Ships and conversions	507	493	603	703
Research and development, test and engineering	2,329	2,592	2,672	2,835
Operations and maintenance	2,134	2,153	2,170	2,233
NASA	1,160	985	998	1,116
Transportation Department, total	126	148	188	297
FAA	110	125	147	236
Highway and transit systems	16	23	41	61
Health, Education and Welfare Department, total	268	289	309	457
Education systems	120	129	135	164
Health care electronics	148	160	174	293

U.S. Markets 1972 Forecast

Market estimates represent U.S. factory sales and are based on an Electronics survey. In certain cases, product categories have been added, deleted, or redefined; these market totals are not directly comparable to those of previous years.

Consumer Electronics

(millions of dollars)	1970	1971	1972	1975
CONSUMER ELECTRONICS, TOTAL*	3,529.3	3,885.1	4,094.0	4,751
Television receivers, total	2,178.0	2,440.0	2,585.0	2,940
Color	1,660.0	1,940.0	2,100.0	2,500
Monochrome	518.0	500.0	485.0	440
Audio equipment, total	1,144.3	1,207.4	1,242.1	1,283
Radios, total	395.0	439.7	446.3	462
Table, clock and portable (AM and FM)	124.0	129.7	136.8	152
Automobile (AM and FM)	271.0	310.0	309.5	310
Phonos and radio-phonos	334.0	341.0	347.0	350
Tape recorders and players, total	280.3	282.7	295.8	306
Auto cassette and cartridge	135.0	135.0	140.0	155
Cassette and cartridge player/recorders	77.9	86.4	100.0	108
Reel-to-reel recorders	67.4	61.3	55.8	43
Hi-fi components (amplifiers, receivers, tuners, speakers, etc.)	135.0	144.0	153.0	165
Other consumer products, total	195.7	222.2	240.3	298
Musical instruments, including organs and amplifiers	141.0	162.0	175.0	210
Kits	54.7	60.2	65.3	88
Automotive electronics, non-entertainment, total	11.3	15.5	26.6	230

*Includes domestic manufactured and domestic-label imports, but does not include foreign-label imports

COMPONENTS

(millions of dollars)	1970	1971	1972	1975
COMPONENTS, TOTAL	5,338.1	5,334.6	5,639.5	6,490
Antennas and antenna hardware, total	423.8	388.0	423.0	493
Capacitors, total	449.3	438.7	460.2	523
Paper	67.8	64.9	63.6	62
Film	83.8	85.1	91.2	108
Electrolytic, total	180.3	166.2	178.2	212
Aluminum	81.5	78.8	83.1	95
Tantalum	98.8	87.4	95.1	117
Mica	19.9	21.8	21.4	17
Glass and vitreous	8.9	7.6	7.0	6
Ceramic	68.8	72.1	75.3	86
Variable	11.7	11.4	11.8	13
Chip	8.1	9.6	11.7	19
Connectors, total	288.4	286.2	311.7	381
Standard coaxial	29.5	29.0	31.0	36
Miniature coaxial	11.0	11.0	13.0	18
Cylindrical	93.0	85.9	90.3	111
Rack and panel	73.6	78.5	87.5	105
Special-purpose and fused	8.9	8.9	8.9	10
Printed circuit, total	65.0	70.0	78.0	98
Card insertion	41.2	43.5	46.0	58
Two-piece, metal-to-metal	13.7	14.1	16.1	21
Plate module	10.1	12.4	15.9	19
Dual in-line sockets	3.4	2.9	3.0	3
Electron tubes, total	999.2	1,045.7	1,055.8	1,060
Receiving	207.0	195.5	178.5	141
Power and special-purpose, total	317.0	320.1	331.9	344
High-vacuum	57.3	54.0	52.7	50
Gas and vapor	15.5	14.7	14.5	13
Klystrons	34.7	33.8	33.1	32
Magnetrons	36.8	34.5	34.3	33
TWT's and backward wave	70.1	68.3	68.1	65
Light sensing	39.2	41.3	44.0	49
Image-sensing (including TV cameras and image intensifiers)	20.6	24.8	29.5	33
Storage	15.2	15.1	15.9	17
Silicon-diode array	3.1	3.2	3.2	8
Display, except CRT	10.1	14.2	19.5	23
Cathode-ray, except TV	14.4	16.2	17.1	21
TV picture, color	408.0	464.3	490.0	540
TV picture, monochrome	67.2	65.8	55.4	35
Filters, networks and delay lines, total	156.9	158.8	164.4	187
Delay lines	16.1	16.5	14.9	14
Passive LC	31.3	30.0	30.4	31
RC networks	40.5	38.9	41.7	50
Crystal filters	26.7	28.6	31.1	33
RFI and EMI filters	38.5	36.9	36.8	40
Active filters	3.8	7.9	9.5	19
Magnetic components, total	255.3	271.3	285.4	298
Computer memory cores	24.9	31.8	41.3	40
Transformers and chokes, except TV	174.0	176.1	179.4	188
Laminated	99.5	108.1	112.3	116
Toroidal	41.1	36.2	36.5	42
Pulse	33.4	31.8	30.6	30
TV magnetic, including yokes and flybacks	40.8	48.3	49.5	54
RF coils	15.6	15.1	15.2	16

(millions of dollars) 1970 1971 1972 1975

Microwave components and hardware, total	78.9	79.6	84.6	94
Mixers	10.1	10.1	10.6	12
Detectors	3.5	3.5	4.1	5
Passive components (filters, couplers, terminations, attenuators, etc.), total	30.3	31.8	33.5	36
Waveguide type	8.2	8.4	8.6	9
Coaxial and stripline	22.1	23.4	24.9	27
Switches, total	10.4	10.6	11.7	14
Waveguide type	3.2	3.3	3.6	4
Coaxial and stripline	7.2	7.3	8.1	10
Ferrite devices, total	20.5	19.6	20.5	22
Isolators	4.1	4.4	4.8	5
Circulators	12.1	10.8	11.1	12
YIG devices	4.3	4.4	4.6	5
Power limiters	4.1	4.0	4.2	5
Printed circuit boards, total	136.4	128.8	136.1	173
Single-layer	21.1	19.9	15.2	10
Two-layer	84.5	79.1	86.7	115
Multilayer	24.7	24.6	28.9	39
Flexible	6.1	5.2	5.3	9
Quartz crystals (including mounts and ovens), total	45.3	45.2	48.6	56
Relays, total	239.6	246.5	262.8	302
Solid state	15.5	16.7	18.9	26
Electromagnetic, total	99.0	104.6	113.8	136
Contact meter	4.9	5.1	5.4	6
Crystal can	26.1	27.0	29.2	34
Dry reed	20.7	22.6	26.5	35
Mercury wetted	14.4	15.5	16.7	20
Resonant reed	1.4	1.9	2.3	4
Telephone	27.5	28.3	29.2	32
Thermal	4.0	4.2	4.5	5
Other	125.1	125.2	130.1	140
Resistors, total	366.1	347.7	353.7	374
Fixed, total	188.6	185.4	182.2	174
Composition	65.1	62.2	57.8	45
Deposited carbon	17.1	14.8	10.7	9
Metal film	51.7	52.0	54.8	59
Wirewound	54.7	56.4	58.9	61
Potentiometers, total	84.6	77.3	78.8	86
Wirewound	30.5	29.7	28.9	25
Non-wirewound	54.1	47.6	49.9	61
Trimmers, total	47.2	42.6	44.9	49
Wirewound	25.7	20.6	20.1	19
Non-wirewound	21.5	22.0	24.8	30
Other, including varistors and thermistors	19.1	18.7	18.9	20
Resistive networks, including film	26.6	23.7	28.9	45
Switches, mechanical, total	176.9	189.2	200.4	213
Coaxial	10.1	10.0	10.8	12
Lighted pushbutton	30.4	32.5	34.5	40
Pushbutton	15.6	17.2	18.9	21
Rotary	36.6	34.2	36.9	37
Snap-action	63.3	70.1	72.2	75
Thumbwheel	7.9	9.4	13.2	15
Stepping	13.0	13.8	13.9	13
Transducers, total	63.9	68.2	76.3	98
Pressure	23.2	25.1	28.5	37
Position	7.1	8.3	9.5	13
Strain	17.3	17.4	17.9	20
Acceleration	7.1	7.3	9.1	13
Other	9.2	10.1	11.3	15
Wire and cable, total	408.0	417.0	451.9	547
Coaxial	92.5	93.5	100.4	118
Flat and flexible	6.5	8.5	12.5	27
Hook-up wire	144.0	146.0	156.0	170
Magnet	90.0	75.0	79.0	91
Multiconductor, shielded	35.0	39.0	44.0	61
Multiconductor, unshielded	50.0	55.0	60.0	80

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Semiconductors, total	1,250.1	1,223.7	1,324.6	1,691
Discrete, conventional devices, total	572.8	514.0	501.9	469
Transistors, total	348.0	301.5	286.9	265
Silicon bipolar, total	273.5	242.5	232.5	222
Small signal (< 1 W dissipation)	168.5	146.0	130.0	94
Power (> 1 W dissipation)	105.0	96.5	102.5	128
Germanium bipolar, total	55.5	39.8	33.3	19
Small signal (< 1 W dissipation)	29.5	16.7	12.5	6
Power (> 1 W dissipation)	26.0	23.1	20.8	13
Field effect	19.0	19.2	21.1	24
Diodes and rectifiers	224.8	212.5	215.0	204
Signal, total	71.5	51.5	50.4	42
Silicon	57.7	44.5	45.0	40
Germanium	13.8	7.0	5.1	2
Zeners, total	41.9	43.1	46.7	49
Voltage regulator	31.0	33.5	36.0	37
Reference	10.9	9.6	10.7	12
Rectifiers, total	111.4	117.9	118.2	113
Silicon	85.8	93.3	95.6	97
Selenium, copper oxide	10.8	10.3	9.6	5
Assemblies	14.8	14.3	13.0	11
Discrete special devices, total	118.2	113.2	120.5	143
Thyristors (SCR's, 4-layer diodes, etc.)	59.8	54.0	57.6	68
Tunnel diodes	2.8	1.8	1.8	1
Microwave diodes, total	14.1	14.6	15.2	18
Avalanche	0.2	0.5	0.9	2
Pin	3.4	4.0	4.4	5
Gunn	0.5	0.9	1.1	3
Varactor	6.0	5.5	5.1	4
Mixer and detector	4.0	3.7	3.7	4
Microwave transistors, total	6.3	8.0	9.5	19
Tuner varactors (< 1 GHz)	7.0	7.5	8.0	8
Multiple devices (duals, diode arrays, etc.)	23.2	23.3	23.4	24
Other (temp., strain sensors, etc.)	5.0	4.0	5.0	5
Integrated circuits, total	432.2	450.1	512.3	746
Bipolar, digital, total	292.0	267.0	289.0	330
SSI (< 12 gates)	243.3	207.0	218.0	197
MSI (12-100 gates)	41.8	48.0	56.0	70
LSI (> 100 gates)	6.9	12.0	15.0	63
MOS, digital, total	61.1	101.0	130.0	260
Linear, total	79.1	82.1	93.3	156
Operational amplifiers	47.1	49.1	56.3	116
All others	32.0	33.0	37.0	40
Optoelectronic devices, total	36.3	39.5	51.0	89
Light-emitting diodes	2.1	4.0	6.5	12
LED displays	2.0	5.0	12.0	28
Photo transistors, (including arrays)	9.0	9.0	9.0	12
Photodiodes, (including arrays)	2.1	2.5	3.5	6
Couplers	1.5	2.5	5.0	9
Silicon targets	3.0	3.0	3.0	9
Photovoltaic (solar) cells	7.3	7.0	7.0	8
Photoconductive cells	9.0	6.5	5.0	5
Multicomponent or hybrid circuits, total	90.6	92.5	109.9	174

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Electronics
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Industrial and Commercial Markets

	(millions of dollars)	1970	1971	1972	1975
INDUSTRIAL AND COMMERCIAL, TOTAL	9,886.3	9,905.1	11,714.5	16,401	
Test and measuring instruments, total	722.5	715.1	758.6	914	
Spectrum analyzers (< 1 GHz)	13.9	14.2	15.1	20	
Frequency synthesizers	14.1	15.2	17.5	25	
Function generators	7.0	7.2	7.6	10	
Signal generators	23.8	24.3	25.8	28	
Sweep generators (< 1 GHz)	10.3	10.8	11.7	15	
Pulse generators (< 1 GHz)	9.9	9.4	10.6	13	
Oscillators (< 1 GHz)	17.0	16.7	17.7	21	
Waveform analyzers and distortion meters	14.0	13.0	14.0	18	
Counters, time and frequency	31.7	28.8	30.8	39	
Timers, electronic	81.0	82.0	83.0	85	
Panel meters, total	32.5	32.0	31.0	36	
Analog	23.0	22.0	20.0	19	
Digital	9.5	10.0	11.0	17	
Frequency measuring (except counters)	11.1	12.4	13.9	16	
Analog voltmeters, ammeters and multimeters (< 1 GHz)	10.1	9.4	8.5	6	
Digital voltmeters, total	37.9	36.3	38.3	42	
3½ digit	10.1	10.4	11.4	13	
4½ digit and above	27.8	25.9	26.9	29	
Automatic bridges	3.6	3.7	4.0	5	
Manual bridges	4.0	4.2	4.3	5	
Calibrators and standards	5.6	5.8	6.0	7	
Oscilloscopes, total	142.6	145.1	157.4	207	
Non-plug-in	73.6	74.8	80.3	102	
Plug-in (mainframe)	57.1	56.8	59.5	80	
Accessories and plug-ins	11.9	13.5	17.6	25	
Recording instruments, total	95.5	92.3	98.6	114	
Magnetic tape	42.6	40.9	42.8	52	
Strip chart	44.1	43.7	47.2	52	
X-Y	8.8	7.7	8.6	10	
Component testers	49.7	51.2	59.4	79	
Power supplies, lab and industrial	107.2	101.1	103.4	123	
Microwave measuring equipment, total	87.1	87.1	95.7	117	
Phase measuring	8.3	9.1	10.5	13	
Impedance measuring	14.1	14.3	15.7	19	
Power measuring	4.4	4.6	4.9	7	
Spectrum analyzers	12.4	13.2	14.1	19	
Frequency measuring	5.1	5.4	6.2	7	
Noise measuring	1.8	1.9	1.9	2	
Signal generators	13.2	12.5	13.7	16	
Sweep generators	15.1	14.3	16.2	20	
Field intensity meters and test receivers	6.9	6.8	7.0	8	
Antenna pattern measuring	5.8	5.0	5.5	6	

Medical equipment, total	529.9	579.7	639.3	832	
Diagnostic equipment, total	399.6	431.5	470.6	577	
X-ray (including intensifiers)	146.0	152.0	160.0	210	
Electrocardiographs	13.5	15.2	18.8	25	
Electroencephalographs	6.1	6.4	6.7	8	
Ultrasonic scanners	2.5	2.8	3.2	5	
Nuclear equipment	26.0	29.9	34.1	39	
Other (lab instrumentation)	195.0	214.0	235.0	275	
Electron microscopes	10.5	11.2	12.8	15	
Patient monitoring systems, total	28.7	34.2	39.4	80	
Cardiac systems	22.1	25.3	28.1	55	
Respiratory systems	1.0	2.7	4.0	11	
Telemetry for monitoring	2.5	2.7	3.0	8	
Transducers for monitoring	3.1	3.5	4.3	6	
Therapeutic equipment, total	28.3	31.1	35.0	46	
X-ray	13.9	15.2	16.7	21	
Ultrasonic	5.1	5.9	7.0	9	
Diathermy	4.7	5.1	5.4	7	
Defibrillators	4.6	4.9	5.9	9	
Prosthetic equipment, total	73.3	82.9	94.3	129	
Hearing aids	41.4	46.5	50.8	61	
Pacemakers	22.9	25.5	31.1	48	
Organ support systems	8.5	10.4	11.9	16	
Motorized limbs	0.5	0.5	0.5	4	

	(millions of dollars)	1970	1971	1972	1975
Computers and related equipment, total	5,971.3	6,012.0	7,396.9	10,771	
General purpose digital systems, total	4,174.0	4,172.0	5,080.0	6,770	
Mini (< \$50,000)	250.0	280.0	365.0	860	
Small (\$50,000 - \$200,000)	495.0	510.0	565.0	780	
Medium (\$200,000 - \$750,000)	1,114.0	1,102.0	1,310.0	1,500	
Large (\$750,000 - \$1,500,000)	1,435.0	1,390.0	1,650.0	1,950	
Giant (> \$1,500,000)	880.0	890.0	1,190.0	1,680	
Analog and hybrid systems	53.5	50.3	51.7	55	
Calculators	119.2	131.1	218.2	491	
Standard (desk)	51.2	52.5	61.0	111	
Programmable	60.1	69.5	108.0	210	
Portable (personal)	7.9	10.1	49.2	170	
Peripheral equipment, total	1,624.6	1,657.6	2,047.0	3,455	
Data entry devices, total	420.0	428.5	467.0	593	
Keypunch (key-to-card)	80.5	78.5	76.5	52	
Key-to-tape	120.8	105.4	107.1	115	
Key-to-disk					
(including shared-processor systems)	22.7	36.8	48.4	78	
Optical character recognition	56.0	70.6	92.0	210	
Source data collection terminals, total	8.5	14.5	56.8	215	
Point-of-sale	4.4	9.8	51.5	195	
Other	4.1	4.7	5.3	20	
Data storage devices, total	975.8	984.4	1,223.1	2,259	
Digital cassette transports	10.5	19.4	35.0	74	
Reel-to-reel tape transports	290.0	376.5	450.0	440	
Disk drives	619.4	530.0	665.0	1,150	
Drum	25.4	22.5	28.1	40	
Secondary (core and semiconductor)	30.5	36.0	45.0	115	
Output equipment, total	125.6	125.5	159.5	225	
Impact line printers	35.5	33.0	40.0	50	
Non-impact printers	12.5	17.0	28.0	35	
Plotters	58.5	50.7	64.0	90	
Computer-output-to-microfilm	19.1	24.8	27.5	50	
Data terminals, total	234.7	241.9	277.6	301	
Teletypewriters	190.0	186.5	211.0	200	
CRT	44.7	55.4	66.6	101	

Industrial operations equipment, total	651.0	589.8	673.7	960	
Motor controls	88.0	83.5	89.7	100	
Numerical controls, total	43.9	35.6	43.0	73	
Point-to-point	18.5	13.7	14.5	20	
Continuous	25.4	21.9	28.5	53	
Inspection systems	41.5	44.9	50.1	84	
Ultrasonic	14.3	15.1	17.4	25	
X-ray	25.2	27.8	31.3	56	
Infrared	2.0	2.0	1.4	3	
Thickness gages and controls, total	32.7	35.7	44.7	76	
Photoelectric	23.1	25.4	33.6	61	
Radiation-based	9.6	10.3	11.1	15	
Factory data-acquisition systems	5.2	6.1	6.8	20	
Process controllers (temperature, pressure flow, etc.)	43.0	40.1	46.9	52	
Process recorders and indicators (temperature, pressure flow, etc.)	60.5	53.1	65.7	72	
Sequence controllers	3.5	8.2	14.1	61	
Ultrasonic cleaning equipment	11.2	12.3	14.8	17	
Pollution monitoring equipment	10.4	12.5	15.1	30	
Industrial and process control computer systems, total	311.1	257.8	282.8	365	
Digital	233.7	206.0	228.5	310	
Analog	77.4	50.8	54.3	55	

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Communications equipment, total	1,723.4	1,719.9	1,933.5	2,516	
Radio, total	565.4	552.9	633.6	748	
Airborne, including ground lines	127.3	111.1	113.0	120	
Land mobile	290.5	295.8	314.4	354	
Marine	17.0	18.6	20.1	24	
Microwave relay	109.7	106.5	165.0	228	
Amateur	11.1	11.0	11.2	12	
Citizens band	9.8	9.9	9.9	10	
Navigation, (radar, loran, VOR, etc.)	149.3	128.0	131.0	150	
Terminal and switching	158.0	170.4	197.3	315	
Intercoms	180.5	195.7	218.5	260	
Commercial sound and p.a.	252.0	243.9	252.1	265	
A-M and F M station equipment	17.5	18.0	19.2	21	
TV station equipment	149.8	142.1	150.3	190	
Facsimile	34.4	39.9	54.9	101	
Telemetry	36.1	35.0	51.4	65	
Modems	38.3	45.8	57.4	150	
Multiplexers	27.5	27.3	30.5	49	
Satellite ground stations	10.0	10.0	10.0	35	
Paging systems	17.1	18.8	20.4	22	
Non-broadcast TV equipment, total	87.5	92.1	106.9	145	
CATV equipment, total	58.0	58.8	64.9	94	
Studio equipment (program origination)	8.7	9.1	10.2	12	
Head-end equipment (including transmitters, receivers, amplifiers, etc.)	5.8	5.8	5.1	7	
Distribution equipment (including amplifiers, power supplies, couplers, transformers)	20.8	21.0	22.7	35	
Transmission lines and fittings	21.1	21.2	23.4	30	
Converters	1.6	1.7	3.5	10	
CCTV equipment, total	24.0	23.2	26.8	33	
Cameras	7.8	8.1	9.5	12	
Monitors	6.9	7.1	8.0	10	
Auxiliary equipment	7.7	8.0	9.3	11	
Video recorders and playback units (non-consumer)	5.5	10.1	15.2	18	
Lasers and associated equipment, total	28.7	34.2	41.8	71	
Gas	9.5	10.2	11.7	17	
Semiconductor	1.2	1.5	2.0	5	
Other (including ruby, neodymium, etc.)	6.8	9.0	11.0	18	
Power supplies	3.9	4.8	5.5	8	
Auxiliary equipment	2.2	2.3	2.8	5	
Welders and machining equipment	1.2	2.2	3.7	10	
Modulators	1.4	1.5	1.6	3	
Rangefinders	2.5	2.7	3.5	5	
Dictating devices (business type)	60.5	63.0	65.0	70	
Power supplies, (OEM type)	70.4	65.1	68.3	90	

Nuclear instruments and equipment, total	41.5	39.2	41.7	60	
Reactor controls	8.1	7.9	8.0	12	
Radiation detection and monitoring equipment, total	7.4	6.9	7.6	11	
Detectors (including ion chambers)	4.2	3.8	3.9	5	
Monitors (portable and fixed)	1.1	1.1	1.5	3	
Personal dosimeters	2.1	2.0	2.2	3	
Pulse analysis instruments	9.5	8.9	9.1	12	
Other instruments and controls	16.5	15.5	17.0	25	